Application ser. no. 10/076,961

## AMENDMENTS TO THE CLAIMS

1. (currently amended)  A computerized method of identifying potentially fraudulent healthcare reimbursement claims, comprising:

determining a sequence of healthcare states for a client from healthcare reimbursement claims associated with the client, wherein determining said sequence comprises:

segregating said healthcare claims by entity;

for each entity, sorting by date;

responsive to sorting, determining states to be modeled, wherein said states are identified at levels based on a state hierarchy process, and wherein each sequence comprises one or more states;

storing said sequence in ~~either~~ a data structure that lists the states in chronological order for each client, said data structure  residing either in a system database ~~and~~ or in working memory;

processing healthcare reimbursement claims for a population of clients and healthcare providers for a selected time interval to identify a total set of potential healthcare states in a collection of healthcare data;

for each individual transition between healthcare states contained in a model derived from the collection of healthcare data, determining a probability of the healthcare state transition as the ratio of the frequency count of a transition from a first state to a next state, to total count of transition for the first state to all other states in the reimbursement claims;

calculating a transition probability of the sequence of healthcare states based on probabilities of individual transitions between healthcare states as contained in  said model, ~~and based on aggregated sequence probability information from previously processed individual sequence probabilities~~, wherein said transition probability of the sequence is the geometric mean of the transition probabilities between each state and the next state in the sequence;

identifying the sequence as potentially fraudulent as a function of the probability of the sequence wherein said probability of sequence is distinct; and

Page 2 of 11

Application ser. no. 10/076,961

outputting a transition metric based on the transition probability of each sequence.

2.      (cancelled)

3.      (currently amended) A method for identifying potentially fraudulent or abusive treatment practices by healthcare providers, comprising:

processing healthcare reimbursement claims for a population of clients and healthcare providers for a selected time interval for treatments provided by the providers to identify a total set of potential healthcare states in a collection of healthcare data and to determine transition probabilities for sequences of healthcare states for the treatments, wherein transition probabilities for sequences are determined based on probabilities of transitions between healthcare states previously calculated by determining a probability of the healthcare state transition as the ratio of the frequency count of a transition from a first state to a next state, to total count of transition for the first state to all other states in the reimbursement claims as contained in a model derived from the collection of healthcare data, and wherein said sequences of healthcare states are created by:

segregating by entity;

for each entity sorting by date;

responsive to sorting, determining states to be modeled, wherein said states are identified at levels based on a state hierarchy process, and wherein each sequence comprises one or more transitions, and wherein the transition probability for a sequence of states is the geometric mean of the transition probabilities between each state and the next state in the sequence;

for each provider, determining an aggregated transition probability for all sequences of healthcare states for treatments provided by the provider; and

identifying as potentially fraudulent at least one provider having aggregated transition probability that is statistically different from the aggregate transition probabilities of similar providers.

4.      (previously presented) The method of claim 3, wherein determining an aggregated transition probability for all sequences of healthcare states for treatment provided by the provider comprises:

for each client treated by a provider, determining a transition probability for each sequence of healthcare states including at least one treatment provided by the provider the client; and

determining the aggregated transition probability for the provider as a function of the transition probabilities determined for each sequence of each client.

5.      (currently amended) The method of claim 4, wherein:

for each pair of states, there is a transition probability for a transition between the states; and

~~the transition probability for a sequence of states is the geometric mean of the transition probabilities between each state and the next state in the sequence.~~

6.      (Canceled)

7.      (previously presented) The method of Claim 3, wherein processing healthcare reimbursement claims for treatments provided by the providers further comprises:

for each client in a population of clients, determining a transition probability for each sequence of healthcare states experienced by the client.

8.      (previously presented) A method for creating a model of healthcare states, comprising:

processing healthcare reimbursement claims for a population of clients and healthcare providers for a selected time interval to identify a total set of potential healthcare states in a collection of healthcare data, each reimbursement claim related to a client and healthcare treatment;

for each client:

extracting from the claims related to the client a plurality of treatments;

Page 4 of 11

determining at least one sequence of healthcare states from the treatments by:

segregating by entity and for each entity sorting by date;

responsive to sorting, determining states to be modeled, wherein said states are identified at levels based on a state hierarchy process, wherein each sequence comprises one or more transitions between states, and wherein each state is associated with a provider;

for each pair of states in each sequence, updating a frequency count of a transition from a first state to a next state;

for each state, determining a total count of transitions from the state to all other states based on the frequency counts;

for each state transition from a first state to a next state, determining a transition probability for the state transition as the ratio of the frequency count from the first state to the next state, to total count of transition for the first state to all other states; and

after all transition probabilities are determined for each state transition, creating a look-up transition probability table that contains all state transition probabilities for subsequent transition probability in said model.

9.    (previously presented) A method of profiling healthcare entities, the method comprising:

processing healthcare reimbursement claims for a population of clients and healthcare providers for a selected time interval to identify a total set of potential healthcare states in a collection of healthcare data;

determining at least one sequence of healthcare states from healthcare reimbursement claims associated with an entity by segregating by entity and for each entity sorting by date, then, responsive to sorting,

determining states to be modeled, wherein said states are identified at levels based on a state hierarchy process, wherein each sequence comprises one or more transitions between states, and wherein a sequence of healthcare states represents client experiences in one or more episodes of care;

for each individual transition between healthcare states contained in a model derived from the collection of healthcare data, determining a probability of the healthcare

state transition as the ratio of the frequency count of a transition from a first state to a next state, to total count of transition for the first state to all other states in the reimbursement claims;

determining a transition probability of each sequence based on transition probabilities of transitions between healthcare states, wherein a previously determined transition probability of an individual healthcare state is determined using the look-up table of Claim 8 , and wherein the transition probability for a sequence of states is the geometric mean of the transition probabilities between each state and the next state in the sequence; and

generating a profile of the entity that includes a transition metric based on the transition probability of each sequence.

10.     (previously presented) The method of any of one of claims 1, 3, 8, or 9, wherein the healthcare states are facilities providing procedures to clients.

11.     (previously presented) The method of any of one of claims 1, 3, 8, or 9, wherein the healthcare states are services codes for healthcare procedures.

12.     (previously presented) The method of any of one of claims 1, 3, 8, or 9, wherein the healthcare states are the healthcare providers.

13.     (previously presented) The method of any of one of claims 1, 3, 8, or 9, wherein the healthcare states are provider-days.

14.     (previously presented) The method of any of one of claims 1, 3, 8, or 9, wherein the healthcare states are provider-service codes.

15.     (currently amended) A system for creating models of healthcare claims, comprising:
a database of healthcare claims, each claim including identification of a client, a provider, at least one procedure, and a date, wherein healthcare reimbursement claims are processed for a population of clients and healthcare providers for a selected time

interval to identify a total set of potential healthcare states in a collection of healthcare data;

a data processing module that processes a set of the claims into date-ordered, entity specific sequences of states by segregating by entity and for each entity sorting by date, then, responsive to sorting, determining states to be modeled, wherein said states are identified at levels based on a state hierarchy process, wherein each sequence comprises one or more transitions between states, and wherein a state comprises any of: facilities providing procedures to clients, services codes for healthcare procedures, healthcare providers, provider-days, and provider-service codes;

a transition processing module that determines, from the date ordered entity specific sequences, a transition metric for each transition between states, wherein said transition metric for each transition between states is based on the ratio of the frequency count of a transition from a first state to a next state, to total count of transitions for the first state to all other states in the reimbursement claims; and

an entity profiling module that generates profiles for at least one entity and a transition metric for one or more sequences of states related to the entity, wherein said transition metric for a sequence of states is the geometric mean of the transition probabilities between each state and the next state in the sequence.

16. (original) The system of claim 15, further comprising:

an analytical module that receives the profiles and identifies entities that are potentially fraudulent or abusive based at least in part upon the transition metrics contained in the profiles.

17. (original) The system of claim 16, wherein the analytical module includes a predictive model.

18. (original) The system of claim 16, wherein the analytical module includes a rules based model.

19.    (previously presented) The system of claim 15, wherein an entity is one of the group consisting of:

    a client;

    a healthcare provider;

    a provider/client; and

    a procedure.